

ABSTRACT

An image sensor element includes a vertical overflow drain structure to eliminate substrate charge diffusion causing CMOS image sensor noise. An extra chemical mechanical polish step is used to shorten the micro-lens to silicon surface distance in order to reduce optical cross talking. One embodiment uses N type substrate material with P- epitaxial layer to form a vertical overflow drain. Deep P well implantation is introduced to the standard CMOS process to prevent latch-up between an N well to an N type substrate. A photo diode is realized by stacked N well / Deep N well and stacked P well / Deep P well to improve performance.